

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A semiconductor laser comprising:

a substrate;

a ~~QW~~ quantum well (QW) active layer structure formed over said substrate, wherein said QW active layer structure includes at least one QW layer comprising $\text{Ga}_x\text{In}_{1-x}\text{As}_y\text{Sb}_{1-y}$ to suppress three-dimensional growth of the at least one QW layer, and wherein $0.3 \leq 1-x$ and wherein $0.003 \leq 1-y \leq 0.008$.

Claim 2 (Original): The semiconductor laser of claim 1, wherein said substrate comprises GaAs.

Claim 3 (Original): The semiconductor laser of claim 1, wherein said laser emits laser light having a wavelength of at least about $1.18 \mu\text{m}$.

Claim 4 (Currently Amended): The semiconductor laser of claim 1, wherein said semiconductor laser comprises a ~~VCSEL~~ Vertical Cavity Surface Emitting Laser (VCSEL).

Claim 5 (Original): The semiconductor laser of claim 4 comprising at least two QW layers of $\text{Ga}_x\text{In}_{1-x}\text{As}_y\text{Sb}_{1-y}$.

Claim 6 (Original): The semiconductor laser of claim 1, wherein said semiconductor laser comprises an edge emitting laser.

Claim 7 (Withdrawn): A method of making a QW layer for a semiconductor laser comprising depositing a layer of Ga, In, As, and Sb onto a GaAs substrate, wherein said In is included at an atomic ratio of 30% or more relative to Group-III elements, and wherein said depositing is performed with a partial pressure of Sb that is sufficient to form an active layer of about 0.3% to about 0.8% in atomic ratio of Sb relative to Group-V elements.

Claim 8 (Withdrawn): A method of making a QW layer for a semiconductor laser comprising depositing a layer of Ga, In, N, As, and Sb onto a GaAs substrate, wherein said In is included at an atomic ratio of 30% or more relative to Group-III elements, and wherein said depositing is performed with a partial pressure of Sb that is sufficient to form an active layer of about 0.2% to about 6% in atomic ratio of Sb relative to Group-V elements.

Claim 9 (Withdrawn): The method of claim 8, wherein said active layer is deposited between barrier layers of $\text{GaN}_z\text{As}_{1-z}$.

Claim 10 (Withdrawn): The method of claim 9, additionally comprising heat treating said active layer after deposition at a temperature of about 675 to 725 degrees C.

Claim 11 (Currently Amended): A semiconductor laser comprising:
a substrate;
a ~~QW~~ quantum well (QW) active layer structure formed over said substrate, wherein said QW active layer structure includes at least ~~one QW layer~~ comprises one QW layer comprising $\text{Ga}_x\text{In}_{1-x}\text{As}_{1-y1-y2}\text{N}_{y1}\text{Sb}_{y2}$ to suppress three-dimensional growth of the at least one QW layer, wherein $0.3 \leq 1-x$, wherein $0 \leq y1 \leq 0.03$, and wherein $0.002 \leq y2 \leq 0.06$.

Claim 12 (Original): The semiconductor laser of claim 11, wherein said substrate comprises GaAs.

Claim 13 (Original): The semiconductor laser of claim 11, wherein said laser emits laser light having a wavelength of at least about 1.24 μm .

Claim 14 (Currently Amended): The semiconductor laser of claim 11, wherein said semiconductor laser comprises a ~~VCSEL~~ Vertical Cavity Surface Emitting Laser (VCSEL).

Claim 15 (Original): The semiconductor laser of claim 14 comprising at least two QW layers of $\text{Ga}_x\text{In}_{1-x}\text{As}_{1-y1-y2}\text{N}_{y1}\text{Sb}_{y2}$.

Claim 16 (Original): The semiconductor laser of claim 11, wherein said semiconductor laser comprises an edge emitting laser.

Claim 17 (Original): The semiconductor laser of claim 11, wherein at least one of said active layers is placed between barrier layers of $\text{GaN}_z\text{As}_{1-z}$.

Claim 18 (Original): The semiconductor laser of claim 17, wherein $0 \leq z \leq 0.05$.

Claim 19 (Currently Amended): A semiconductor laser comprising:
an active layer comprising GaAsInNSb, a quantity of Sb selected to reduce three-dimensional growth of the active layer, and a quantity of In selected to provide longer wavelength operation of the semiconductor laser ~~co-deposited Ga, As, In, N, and Sb; and~~

a pair of barrier layers, one on each side of said active layer, said barrier layers comprising ~~Ga, As, and N~~ GaAsN.

Claim 20 (Original): The semiconductor laser of claim 19, wherein said substrate comprises GaAs.

Claim 21 (Original): The semiconductor laser of claim 19, wherein said semiconductor laser has a lasing wavelength of at least about 1.24 μm .

Claim 22 (Currently Amended): The semiconductor laser of claim 19, wherein said semiconductor laser comprises a ~~VCSEL~~ Vertical Cavity Surface Emitting Laser (VCSEL).

Claim 23 (Original): The semiconductor laser of claim 19, wherein said semiconductor laser comprises an edge emitting laser.

Claim 24 (Withdrawn): A method of making a semiconductor laser comprising:
depositing a first barrier layer of $\text{GaN}_z\text{As}_{1-z}$ onto a substrate;
depositing an active layer of $\text{Ga}_x\text{In}_{1-x}\text{As}_{1-y_1-y_2}\text{N}_{y_1}\text{Sb}_{y_2}$ over said first barrier layer; and
depositing a second barrier layer of $\text{GaN}_z\text{As}_{1-z}$ over said active layer.

Claim 25 (Withdrawn): The method of claim 24, wherein said substrate comprises GaAs.

Claim 26 (Withdrawn): The semiconductor laser of claim 24, wherein said semiconductor laser comprises a VCSEL.

Claim 27 (Withdrawn): The semiconductor laser of claim 24, wherein said semiconductor laser comprises an edge emitting laser.

Claim 28 (Withdrawn): The method of claim 24, wherein 0.3_{1-x} , wherein $0 \leq y_1 \leq 0.03$, and wherein $0.002 \leq y_2 \leq 0.06$.

Claim 29 (Withdrawn): The method of claim 24 wherein $0 < z \leq 0.05$.

Claim 30 (Withdrawn): The method of claim 24, additionally comprising heat treating said layers at a temperature of about 675 to about 725 degrees C.

Claim 31 (Withdrawn): A method for manufacturing a semiconductor laser device comprising:

forming a laser structure by depositing a QW active layer structure over a substrate, wherein said QW active layer structure includes at least one QW layer comprising $Ga_xIn_{1-x}As_{1-y_1-y_2}N_{y_1}Sb_{y_2}$, wherein $0.3 \leq 1-x$, wherein $0 \leq y_1 \leq 0.007$, and wherein $0.002 \leq y_2 \leq 0.06$, and

heat treating said laser structure, after growth of said QW active layer structure at a temperature of about 570 to 630 degrees C.

Claim 32 (Withdrawn): A method for manufacturing a semiconductor laser device comprising:

forming a laser structure by depositing a QW active layer structure over a substrate, wherein said QW active layer structure includes at least one QW layer comprising Ga_xIn_{1-x} .

$x\text{As}_{1-y_1-y_2}\text{N}_{y_1}\text{Sb}_{y_2}$, wherein 0.3_{1-x} , wherein $0.007 \leq y_1 \leq 0.03$, and wherein $0.002 \leq y_2 \leq 0.06$,
and

heat treating said laser structure, after growth of said QW active layer structure at a
temperature of about 670 to 730 degrees C.